

due left on the valves or in the cylinder head will contaminate the engine oil and cause excessive wear and damage. After drying the cylinder head, lubricate the valve guides with engine oil to prevent rust.

2. Install the spring seat (B, **Figure 32**).
3. Install new valve seals as follows:

NOTE

New valve seals must be installed whenever the valves are removed.

- a. Lubricate the inside of each new valve seal with molybdenum disulfide paste.
 - b. Install the new valve seal over the valve guide and seat it into place (A, **Figure 32**).
4. Coat a valve stem with molybdenum disulfide paste and install it into its correct guide.

NOTE

*Install both valve springs so the end with the coils closest together (**Figure 42**) faces toward the cylinder head.*

5. Install the inner and outer valve springs.
6. Install the valve spring retainer.

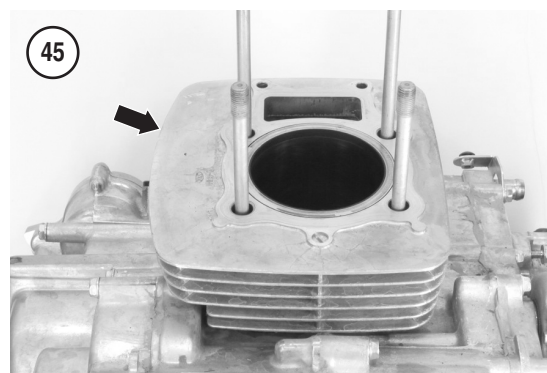
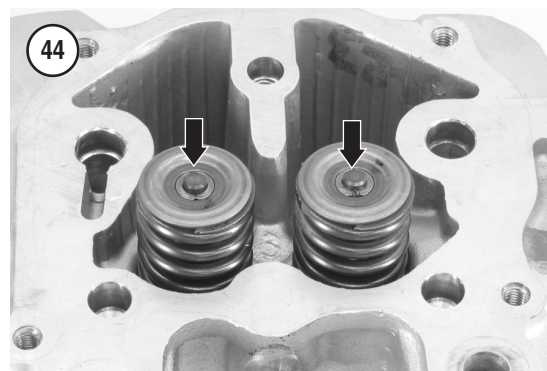
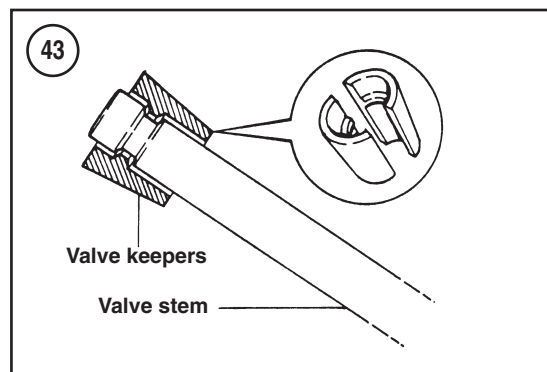
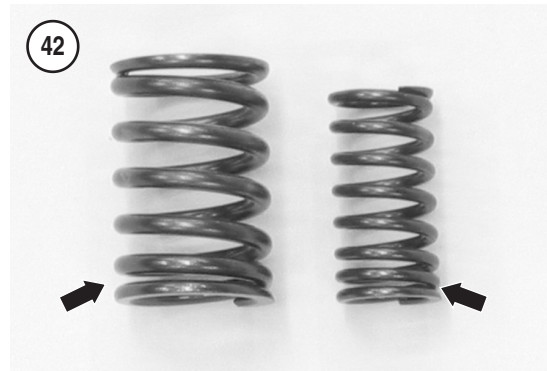
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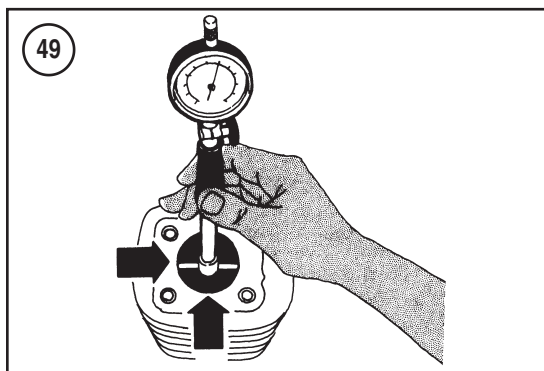
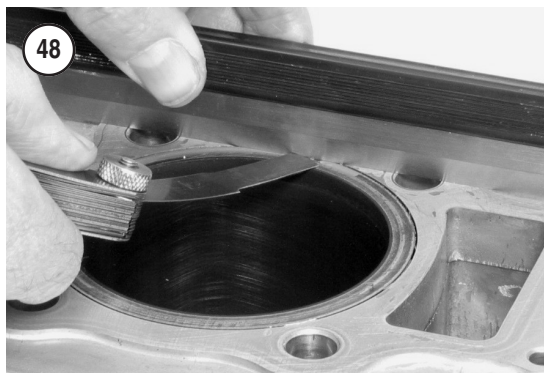
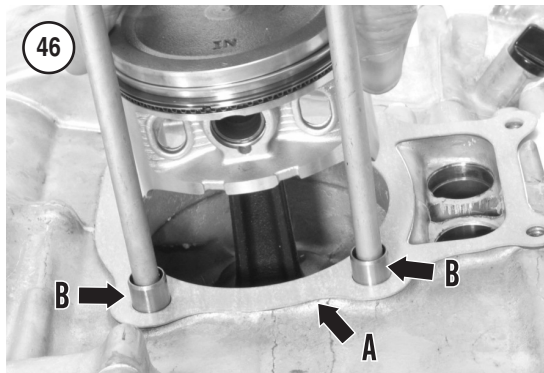
Wear safety glasses or goggles when performing Step 7.

7. Install the valve spring compressor (**Figure 30**). Push down on the upper valve seat and compress the springs, then install the valve keepers (**Figure 43**). Release tension from the compressor and make sure the keepers seat evenly around the end of the valve. Tap the end of the valve stem (**Figure 44**) with a soft-faced hammer to ensure the keepers are properly seated.
8. Repeat Steps 2-7 for the opposite valve.
9. After installing the cylinder head and rocker arm holder onto the engine, adjust the valve clearance. See Chapter Three.

CYLINDER

The alloy cylinder has a pressed-in cast iron cylinder liner. Oversize piston and ring sizes are available through Honda dealerships and aftermarket piston suppliers.





The cylinder and piston can be serviced with the engine mounted in the frame. Because of the engine's mounting position in the frame, the following photographs are shown with the engine removed for clarity.

Removal

1. Remove the pushrods and cylinder head as described in this chapter.
2. Loosen the cylinder by tapping around the perimeter with a rubber or plastic mallet.
3. Pull the cylinder (**Figure 45**) straight up and off the crankcase. Remove and discard the base gasket (**A, Figure 46**).
4. If necessary, remove the piston as described in *Piston and Piston Rings* in this chapter.
5. If necessary, remove the cam followers as described in *Camshaft* in this chapter.
6. If necessary, remove the two dowel pins (**B, Figure 46**).
7. Cover the crankcase opening to prevent objects from falling into the crankcase.

Inspection

Refer to **Table 2** when measuring the cylinder in this section.

1. Remove all gasket residue from the top and bottom cylinder gasket surfaces.
2. Wash the cylinder (**Figure 47**) in solvent. Dry it with compressed air.
3. Check the dowel pin holes for cracks or other damage.
4. Check the cylinder for warp with a feeler gauge and straightedge as shown in **Figure 48**. Check at several places on the cylinder and compare it to **Table 2**. If it is out of specification, refer service to a Honda dealership.

NOTE

Unless the precision measuring equipment and expertise are available, have the cylinder bore measured by a Honda dealership or machine shop.

5. Measure the cylinder bore with a bore gauge or inside micrometer (**Figure 49**) at the points shown in **Figure 50**. Measure in 3 axes: aligned with the piston pin and at 90° to the pin. Use the maximum

bore dimension to determine cylinder wear. Average the other measurements to determine taper and out-of-round. If any dimension is out of specification (**Table 2**), the cylinder must be rebored and a new piston and ring assembly must be installed. Refer this service to a Honda dealership.

NOTE

*To determine piston clearance, refer to **Piston and Piston Rings** in this chapter.*

6. If the cylinder is not worn past the service limit, check the bore for scratches or gouges. The bore still may require boring and reconditioning.

CAUTION

The soap and water described in Step 7 is the only solution that can wash the fine grit residue out of the cylinder crevices. Solvent and kerosene cannot do this. Grit residue left in the cylinder will act like a grinding compound and cause rapid and premature wear to the contact surfaces of the piston rings, cylinder bore and piston.

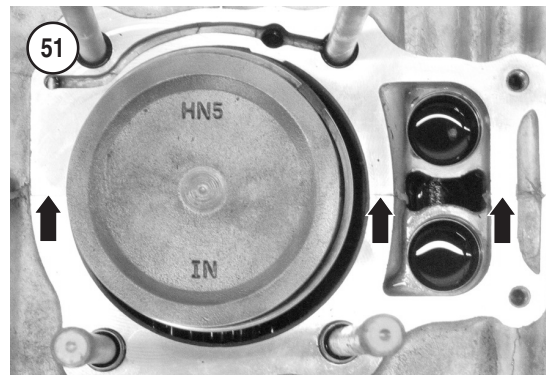
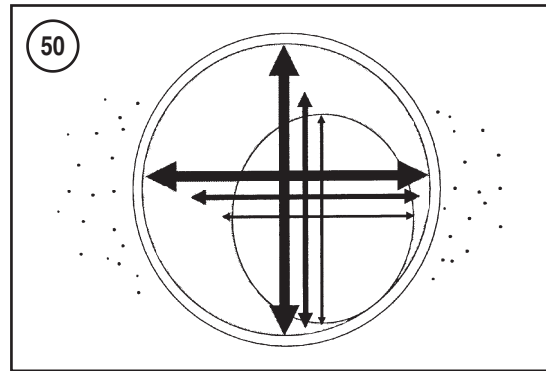
7. After servicing the cylinder, wash the bore in hot soapy water. This is the only way to clean the cylinder wall of the fine grit material left from the bore or honing job. After washing the cylinder wall, run a clean white cloth through it. The cylinder must be free of all grit and other residue. If the rag is dirty, rewash the cylinder wall again and recheck it with the white cloth. Repeat until the cloth comes out clean. When the cylinder is clean, lubricate it with engine oil to prevent the cylinder liner from rusting.

Installation

1. Make sure the top and bottom cylinder surfaces are clean of all gasket residue.
2. If the cam followers were removed, install them as described in *Camshaft* in this chapter.
3. If the pistons and rings were removed, install them as described in *Piston and Piston Rings* in this chapter.

CAUTION

Be sure to install and secure the piston pin circlips.



4. Install the two dowel pins into the crankcase (B, **Figure 46**).
5. Apply a non-hardening liquid gasket sealer to the seams of the crankcase mating surfaces shown in **Figure 51**.

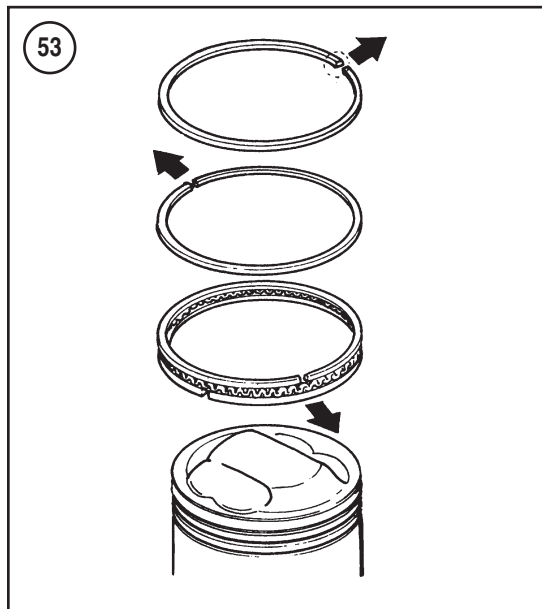
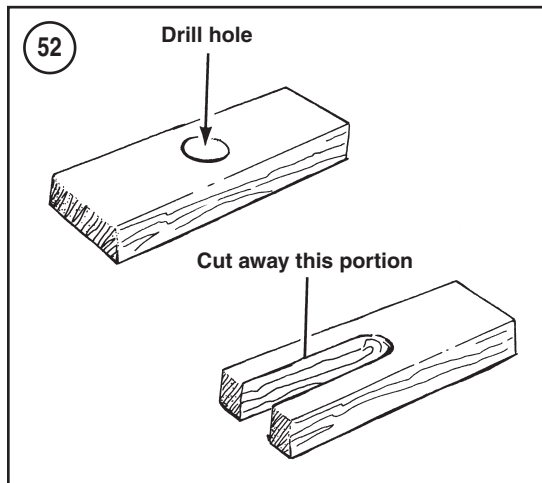
CAUTION

Do not get any of the sealer on the piston skirt or cam followers. Otherwise, engine damage may occur.

6. Install a new base gasket onto the crankcase (A, **Figure 46**). Make sure all holes align.
7. Install a piston holding fixture (**Figure 52**) under the piston.
8. Lubricate the cylinder wall, piston and rings with engine oil.
9. Stagger the piston rings around the piston as shown in **Figure 53**.

NOTE

It is easier to install the cylinder over the piston by first compressing the rings with a ring compressor. As the cylinder is installed over the piston, the rings pass into the cylinder com-



pressed and then expand out once they are free of the ring compressor. A hose clamp works well for this. Before using a ring compressor or hose clamp, lubricate its ring contact side with engine oil. When using a ring compressor or hose clamp, do not overtighten. The tool should be able to slide freely as the cylinder pushes against it.

10A. Compress the rings with a ring compressor or appropriate size hose clamp. Then align the cylinder with the piston and carefully slide it down past the rings. When all of the rings are installed in the

cylinder, hold the cylinder block and remove the ring compressor or hose clamp.

10B. When not using a ring compressor or hose clamp, align the cylinder with the piston and install the cylinder; compress each ring with your fingers as the ring enters the cylinder.

11. Remove the piston holding fixture and slide the cylinder all the way down.

12. While holding the cylinder down with one hand, operate the recoil starter. The piston must move up and down in the bore with no binding or roughness.

NOTE

If the piston does not move smoothly, one of the piston rings may have slipped out of its groove when the cylinder was installed. Lift the cylinder and piston up together so there is space underneath the piston. Install a clean rag underneath the piston to catch any pieces from a broken piston ring, then remove the cylinder.

13. Install the cylinder head and pushrods as described in this chapter.

PISTON AND PISTON RINGS

The piston is made of an aluminum alloy. The piston pin is made of steel and is a precision fit in the piston. The piston pin is held in place by a clip at each end.

Refer to **Figure 54**.

Piston Removal/Installation

1. Remove the cylinder as described in this chapter.
2. Block off the crankcase below the piston to prevent the piston pin circlips from falling into the crankcase.
3. Before removing the piston, hold the rod and rock the piston (**Figure 55**). Any rocking motion (do not confuse with the normal sliding motion) indicates wear on the piston pin, rod bore, pin bore, or a combination of all three.

WARNING

Wear safety glasses or goggles when removing the circlips in Step 4.

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